Cost Analysis of Selected Structures at Nike Site Summit

Battery Building at Site Summit

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1.0 INTRODUCTION

Fort Richardson proposes to develop and implement a management strategy for Nike Site Summit (Site Summit) located on a peak adjacent to Mount Gordon Lyon on the eastern boundary of South Post, Fort Richardson, Alaska. Fort Richardson is proposing to manage Site Summit in a manner which accommodates U.S. Army Alaska's military training requirements, maintains the site's historic integrity, is fiscally responsible and eliminates health and safety issues. This undertaking would involve implementation of a management strategy to include, Site Summit buildings and structures, remediation and abatement efforts, human health and safety, existing tenants (communication infrastructure), and access (trespass issues) within the Nike Site Summit Historic District. This undertaking will cause an adverse impact on the historic resources at Nike Site Summit.

In the course of the National Historic Preservation Act's Section 106 consultation for this undertaking, the Army agreed to conduct a cost analysis of various management options for selected structures at Nike Site Summit. The structures selected for analysis were those structures which the Army proposed for demolition in the January 2008 Final Finding of No Significant Impact and Environmental Assessment for the Management of Nike Site Summit. The following report analyzes the costs of stabilization, long-term maintenance and demolition for each of the selected structures.

1.1 Location and Background Description

Site Summit is located within the eastern military installation boundary of Fort Richardson, an active Army Post and training area, which is located in south-central Alaska, approximately seven miles northeast of downtown Anchorage (Figure 1). Site Summit consists of the Upper Site, Lower Site, and the approximately 1.5-mile gravel road which connects the two sites. Grading activities and flattening of the topography during the construction of Site Summit has caused it to be a visually-prominent topographical feature. Site Summit resides along the southwestern flank of Mt. Gordon Lyon at an elevation of 3,500 to 3,900 feet above sea level and is located approximately five miles east of the Fort Richardson Cantonment Area which, in comparison, has typical elevations of 350 to 400 feet above sea level.

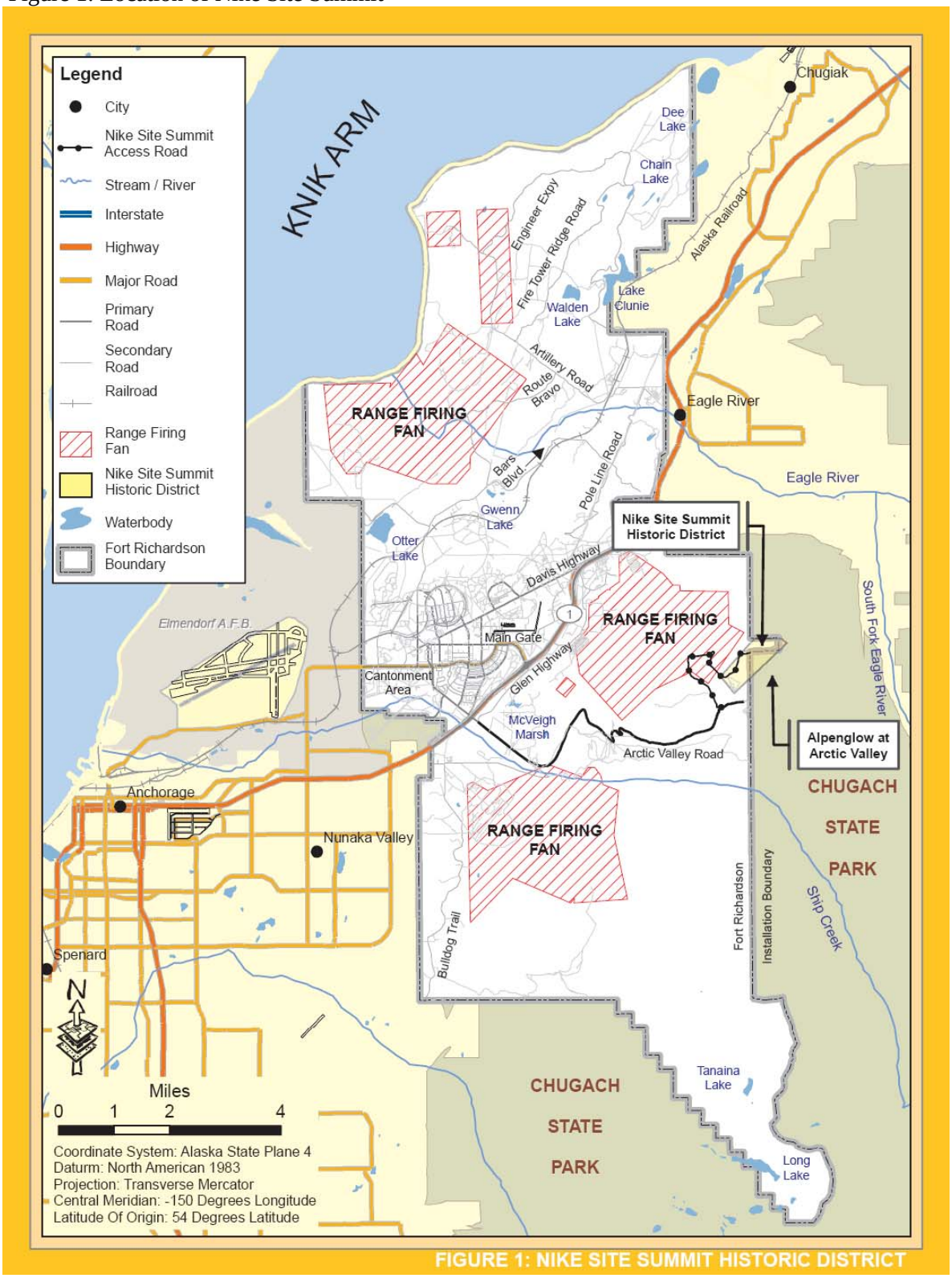
Developed portions of the site consist of 33 elements which include buildings, bunkers, communication infrastructure, foundations of former buildings and an access road connecting the Upper and Lower sites. Twenty-seven of these elements contribute to the Nike Site Summit Historic District. Undeveloped portions of the site contain alpine vegetation. The land use adjacent to Site Summit includes live-fire training areas to the northwest, Alaska State parklands to the east (Chugach State Park), and the Alpenglow at Arctic Valley public ski area directly to the south. Access to Site Summit is provided by an access-restricted unnamed road off of Arctic Valley Road (see Figure 1).

Site Summit is one of the few remaining Nike missile sites in the United States, and one of a few Nike sites in the United States from which Nike missiles were launched. In 1996, Site Summit was listed on the National Register of Historic Places (NRHP) as a Historic District. The Nike Site Summit Historic District encompasses approximately 244 acres, of which approximately 130 acres, is located within Army land.

As a property listed on the NRHP, Site Summit derives its historic significance from its association with events that have made a major contribution to the broad patterns of American history. Site Summit is also listed under special consideration as a historically significant property less than 50 years of age (Clemens and Sackett, 1995:4,14-15). A product of the mid-20th century American political environment, when military strategy encompassed nuclear warfare planning for the first time, Site Summit played a major

role in defending the United States and Canada against foreign attack and reflects a major step in the development of modern warfare. This site was initiated in 1959, and eventually deactivated in 1979 due

Figure 1: Location of Nike Site Summit



to rapidly developing military technologies no longer necessitating the use of Site Summit. Upon deactivation, the buildings were stripped of sensitive equipment pertaining to the operation and maintenance of Nike missiles. Basic electrical and mechanical equipment, along with general furnishings, were also removed from supporting facilities, leaving only two large generators that were too massive to be taken from the site in a cost- or labor-efficient manner. Military personnel patrolled the site until 1986, at which point the area was left unoccupied. Since then, the buildings have slipped into various states of disrepair due to weather, vandalism, and vacancy (Clemens and Sackett, 1995:5; USAG-AK 2006a).

Since deactivation and continuing today, primary uses of the site include occasional military training and communications (through leasing space for communications equipment). Site Summit is restricted from public access due to the physical safety risks from building structural instability, human health risks due to exposed hazardous substances (i.e., asbestos and lead paint) and due to a live-fire training range firing fan which overlaps the access road to Site Summit. As Site Summit is highly visible and readily accessible to the public from adjacent State recreation lands, trespassing and vandalism are also reoccurring issues.

Site Summit is also the location of a local Anchorage tradition. Beginning in 1960, Fort Richardson has maintained an illuminated star (Star) strung across the slope of Mount Gordon Lyon just under the Lower Site of Site Summit. The Star is lit throughout the winter holiday season with a lighting ceremony held in conjunction with the Anchorage Christmas tree lighting. This feature has become a significant visual icon for the local community and is a tangible feature of the local culture (Arctic Soldier, 1992; Hollinger, 2004:13). Although the Star has not reached the 50-year mark for NRHP eligibility, it is a significant cultural element in the landscape.

1.2 Goals and Objectives

The purpose of the undertaking is to develop a long-term management strategy for Site Summit that meets human health and safety, access, military mission, cultural resource, and facility management objectives. Currently, there is not a consolidated management strategy that considers these issues. The result is the ongoing deterioration of several facilities at Site Summit. Fort Richardson has developed the following goals for a long-term management strategy for Site Summit:

- Proceed with successful completion of a Section 106 consultation compliant with the National Historic Preservation Act (NHPA);
- Minimize human health and safety risks and deter existing trespassing;
- Maintain the Army training mission at Fort Richardson without interruption or interference; and
- Reduce military expenditures to maintain unusable buildings as required by Army Regulation (AR) 415-15, *Army Military Construction and Nonappropriated – Funded Construction Program Development and Execution.*
- Comply with all applicable executive orders, Federal statutes, regulations, and Army mission, doctrines, and standards.

The objectives of the undertaking are to:

- Manage Nike Site Summit Historic District to preserve the important Cold War history of the site and effectively tell the story of those who served there;
- Remove or abate hazardous substances to legally compliant levels to protect human health and safety at Site Summit;
- Manage structures to protect human health and safety and meet standards of Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks*;

- Maintain the Army training mission at Fort Richardson without interruption or interference;
- Prevent the potential of vandalism from interrupting vital State and Federal communications equipment located at the Upper Site; and
- Reduce approximately 63,500 ft^2 of excess buildings as required by AR 415-15, *Army Military Construction and Non-appropriated – Funded Construction Program Development and Execution*.

2.0 METHODS

The estimating team after careful consideration endeavored to provide an estimate that: 1. Retained as much of the architecture as practicable to tell the story of what once took place at the site. 2. Removed all materials that would increase future maintenance and/or mitigation cost requirements for the Army and present a current and future risk and to the public and environment. 3. Eliminate as much as possible any need to seal off or otherwise enclose space to minimize the attractive nuisance aspect of the site and therefore reduce as much as possible the incentive for forcible entry.

2.1 Cost factors

2.1.1 Abatement

To obtain 3rd party clarity of cost the Site Summit project estimating team contacted the Air Force Center for Environmental Excellence (AFCEE) to corroborate in-house experience and historical data for estimating hazardous material abatement and to confirm required regulations. The work sheet provided by AFCEE was the result of recent work at Elmendorf AF base and is corroborated by historical data from Ft. Richardson. The costs for abatement from AFCEE were used with historical data from Job Order Contracts (JOC) projects in preparation of the estimate. The AFCEE work sheet with estimating figures and required regulations is included as attachment "A".

2.1.2 Government Cost Factor

Another aspect to be considered in addition to the costs of hazmat abatement is the cost of doing business for the government. The high cost of doing business in government is an unavoidable contributing factor. All work completed on Ft. Richardson is by one means or another contracted through the Army Corps of Engineers. In the estimate preparation process comparable costs were used from existing JOC (a USACE sponsored contracting method) contract agreements since a JOC contract it is the most likely means for accomplishing this work.

To put this in perspective the USACE estimated costs for Class "A" new construction is currently over $400 per square foot in the Ft. Richardson cantonment area. At today's costs and allowing for the logistics involved with Site Summit it would cost the government somewhere in the neighborhood of $50 million to construct the Battery Building at Site Summit. The entire Site Summit development would likely be into the $100's of millions at today's costs.

2.1.3 Logistics

A third contributing factor to the high cost of doing work at Site Summit is the logistics involved. Logistics for any action at Site Summit are difficult and time consuming. In estimating time really is money. Travel from Ft. Richardson proper to the upper site is 30 to 60 minutes or more dependent upon weather, road conditions and means of conveyance. The 30 minute estimate is for a light vehicle with

good weather and good road conditions. The road surface is unimproved, has grades up to 18% with steep drop offs and no proper guard rails. Inclement hauling is in actuality not a consideration.

Heavy equipment hauling heavy loads down the mountain would have to use the lowest gears and then it is an extremely hazardous operation. In the event of brake failure there are no runaway ramps. The time factor alone has a major impact on cost. The simple but necessary act of transporting crews, equipment and materials back and forth from Ft. Richardson becomes an exceedingly expensive proposition.

2.2 Site Conditions

Site Summit is unique in many ways but perhaps the most the most extreme aspect of its character is that of climate. The several thousand feet that separates it from the relatively mild coastally moderated subarctic climate of Anchorage is equal to hundreds of miles in latitude. The climate at Site Summit is in some aspects more extreme than that of many areas of the arctic.

Its most specific feature climatologically speaking is that of extreme high winds located as it is on a mountain top and specifically the particular location of the peak that it is sited on. Wind design speeds for Ft. Richardson are 10-20 miles per hour higher than those for downtown Anchorage. The prevailing directions for the high winds Ft. Richardson receive descend directly from over the summit of Site Summit. Anyone who has ever driven the Glenn Highway during a wind storm is aware of the extreme winds that develop between the Ft. Richardson overpass and the weigh stations. There is a spectacular wind corridor right over the peak.

"Construction of radomes high above the ground was hazardous when the wind blew … which was usually."

"During its service Site Summit on Mount Gordon Lyon would experience its coldest night in February 1969 with -45°F temperature. The mountain top site would also experience a maximum wind of 260 KPH."

These quotes were taken from HAER: Historic American Engineering Record - The Nike System in Alaska - D. Colt Denfeld - U.S. Army Corps of Engineers Alaska District January 1988.

A wind speed of 260 KPH is 161.5 MPH. The high potential for severe cold and extreme wind speed ultimately makes maintenance of any architectural facility a particularly daunting and costly challenge at Site Summit. Site Summit has approximately a 3-4 month work season but probably half of those days are fair weather work days.

3.0 COST ANALYSIS

Structure	Demolition	Stabilization	
		Abatement and Repair	Annual Maintenance
39199 Dog Kennel	$20,236	N/A	$0
39219 Sentry Station	$6,183	$8,302	$502
39221 Sentry Station	$12,136	$13,760	$672

39231 Sentry Station	$14,385	$17,431	$869
39225 Launch Control Facility	$263,019	$407,100	$15,700
39227 Vehicle Maintenance Facility	$144,292	$242,723	$10,010
39229 Guided Missile Maintenance Facility	$68,859	$116,752	$5,360
39243 Electrical Substations D1 and D2	$102,236	$152,236	$1500
39600 Battery Control and Barracks Building (Wood Structure Only)	$627,223	$1,428,828	$48,523
39600 Battery Control and Barracks Building	$765,322	$1,671,443	$75,369
Target Ranging Radar	$64,557	$63,030	$485
Target Tracking Radar	$64,557	$63,030	$485
Missile Tracking Radar	$64,557	$63,030	$485
TOTAL	$2,217,562	$4,247,665	**$159,960**

3.1 Dog Kennel 39199

3.1.1 Site Information

AHRS Site Number ANC-809
Date of Construction: 1959
Function: Security
Building Materials: Wood, Metal

3.1.2 Visual Hazard Materials Assessment

No suspected ACM or other potential hazardous materials were identified inside the structure. Several 55-gallon drums were located along the outside west wall of the kennel. All drums appeared to be empty however a small amount of liquid material may still be present within each drum.

3.1.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$20,236	N/A	$0

[1]Cost of demolition for the Dog Kennel calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization not applicable since the structure has already fallen down.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.2 Sentry Station 39219

3.2.1 Site Information

AHRS Site Number ANC-802
Date of Construction: 1959
Function: Security
Building Materials: Cresote Timbers

3.2.2 Visual Hazard Materials Assessment

No suspected ACM or other potential hazardous materials were identified inside or outside this structure. Creosote timbers used in the construction of the building are not listed as a hazardous material but are regulated for disposal.

3.2.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$6,183	$8,302	$502

[1]Cost of demolition for the Sentry Station calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Sentry Station calculated to include retention concrete and metal framing, removes roof, wood framing and outer sheathing, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.3 Sentry Station 39221

3.3.1 Site information

AHRS Site Number ANC-806
Date of Construction: 1959
Function: Security
Building Materials: Wood Frame, Plywood

3.3.2 Visual Hazard Materials Assessment

No suspected ACM or other potential hazardous materials were identified inside or outside this structure.

3.3.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$12,136	$13,760	$672

[1]Cost of demolition for the Sentry Station calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Sentry Station calculated to include retention concrete and metal framing, removes roof, wood framing and outer sheathing, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.4 Sentry Station 39231

3.4.1 Site Information

AHRS Site Number ANC-803
Date of Construction: 1959
Function: Security
Building Materials: Wood Frame, Plywood

3.4.2 Visual Hazard Materials Assessment

No suspected ACM or other potential hazardous materials were identified inside or outside this structure.

3.4.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$14,385	$17,431	$869

[1]Cost of demolition for the Sentry Station calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Sentry Station calculated to include retention concrete and metal framing, removes roof, wood framing and outer sheathing, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.5 Launch Control Building 39225

3.5.1 Site Information

AHRS Site Number ANC-805
Date of Construction: 1959
Function: Maintenance
Building Materials: Cement Asbestos Panels, Wood Battens, Poured Concrete, Wood Frame

3.5.2 Visual Hazard Materials Assessment

Transit wallboard was potentially identified in rooms 103 and estimated to be 225 sq/ ft. Material was in good to fair condition and not viewed as an inhalation hazard in its current condition. Additionally, several heat expansion joints associated with the HVAC system were identified.

The following potential hazardous materials were identified within the building:

- PCB lighting ballast (approx 34 units)
- Lead-based paint

3.5.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$263,019	$407,100	$15,700

[1]Cost of demolition for the Launch Control Building calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Launch Control Building calculated to include retention concrete and metal framing, removes roof, wood framing and outer sheathing, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.6 Vehicle Maintenance Shop 39227

3.6.1 Site Information

AHRS Site Number ANC-805
Date of Construction: 1959
Function: Maintenance
Building Materials: Cement Asbestos Panels, Wood Battens, Poured Concrete, Wood Frame

3.6.2 Visual Hazard Materials Assessment

The following Suspected ACMs were identified within the building:

- 9” x 9” asphalt tiles (confirmed to contain 2-3% chrysotile)
- Floor leveling compound
- Tile mastic
- Wainscot cement asbestos board
- HVAC vibration gaskets
- Fire Doors
- Window chalking
- Steam and Hot Water line insulation material (confirmed to contain 20-30% amosite and 3-5% crocidolite)
- Electrical panel backing

Most of identified materials were noted in small quantities either scattered on the floor or intact in isolated locations. Lead-based paint removal was not estimated.

Additionally, the following potential hazardous materials were identified within the building:

- PCB lighting ballast (approx 18 units)
- Lead-based paint

3.6.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$144,292	$242,723	$10,010

[1]Cost of demolition for the Vehicle Maintenance Shop calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Vehicle Maintenance Shop calculated to include retention concrete and metal framing, removes roof, wood framing and outer sheathing, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.7 Guided Missile Maintenance Facility 39229

3.7.1 Site Information

AHRS Site Number ANC-804
Date of Construction: 1959
Function: Maintenance
Building Materials: Concrete, Corrugated Metal

3.7.2 Visual Hazard Materials Assessment

The following Suspected ACMs were identified within the building:

- 9" x 9" asphalt tiles (confirmed to contain 2-3% chrysotile)
- Floor leveling compound
- Tile mastic
- Wainscot cement asbestos board
- HVAC vibration gaskets
- Fire Doors
- Window chalking
- Steam and Hot Water line insulation material (confirmed to contain 20-30% amosite and 3-5% crocidolite)
- Electrical panel backing

Again, most of identified materials were noted in small quantities either scattered on the floor or intact in isolated locations. Cost to remove all suspected ACM is $25,000. Lead-based paint removal was not estimated.

Additionally, the following potential hazardous materials were identified within the building:

- PCB lighting ballast (approx 18 units)
- Lead-based paint

3.7.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$68,859	$116,752	$5,360

[1]Cost of demolition for the Guided Missile Maintenance Facility calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Guided Missile Maintenance Facility calculated to include retention concrete and metal framing, removes roof, wood framing and outer sheathing, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.8 Electrical Substation D1 and D2 39243

3.8.1 Site information

AHRS Site Number ANC-811
Date of Construction: 1959
Function: Electrical System
Building Materials: Metal, Corrugated Aluminum Siding

3.8.2 Visual Hazard Materials Assessment

No suspected ACM or other potential hazardous materials were identified inside or outside this structure. However, since this building housed transformers there is the possibility that there could be PCBs in the soil. Abatement costs include the potential abatement of PCBs for both demolition and stabilization estimates.

3.8 3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$102,236	$152,236	$1,500

[1]Cost of demolition for the Electrical Substations calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation and metal superstructure.
[2]Cost of stabilization for the Guided Missile Maintenance Facility calculated to include retention of concrete and metal framing and outer sheathing, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.9 Battery Control and Barracks Building 39600

3.9.1 Site Information

AHRS Site Number ANC-792
Date of Construction: 1959
Function: Administration, Barracks, Tracking
Building Materials: Metal, Cement Asbestos Board Panel Siding, Concrete, Aluminum

3.9.2 Visual Hazard Materials Assessment

Exterior transite wallboard was observed to have been broken, chipped and crushed. Material was observed scattered throughout the fenced upper site boundary area. Estimated quantity of wallboard is 9,900 sq/ft. This material will need to be removed if access to the general public is proposed to reduce potential inhalation/ingestion hazard. This material represents the greatest exterior inhalation hazard observed on the site. Cost to stabilize the transite material still attached to the building will vary depending on the level of access the public will have to the site and the level of potential risk the command is willing to accept..

The following Suspected ACMs were identified within the building:

- 9” x 9” asphalt tiles (confirmed to contain 2-3% chrysotile)
- Floor leveling compound
- Tile mastic
- Wainscot cement asbestos board
- HVAC vibration gaskets
- Fire Doors
- Window chalking
- Steam and Hot Water line insulation material (confirmed to contain 20-30% amosite and 3-5% crocidolite)
- Utility sink coating
- Electrical panel backing
- 1’ x 1’acoustical ceiling tiles

- Mastic from ceiling tiles
- Sheet flooring

Pipe insulation wrap (thermal) was located in the utility tunnel, exterior walls in rooms 110, 112, 116, 118, 119, 123, 124, and within the mechanical room. Estimated linear footage of ACM pipe wrap is 3,750. All material was in poor to extremely poor condition. Broken and exposed friable material could be observed in several locations throughout the building. This material is considered friable and the inhalation hazardous is considered high. If this material is allowed to dry, the potential exposure hazard would change for high to extremely high. This material represents the single greatest identified suspected ACM inhalation hazard at the Nike Summit site.

Suspected ACM 9" x 9" asphalt tiles, leveling compound, and tile mastic were identified in rooms 111, 112, 113, 115, 116, 117, 118, 119, 120, 122, 123, 124, 126, and 127. Estimated quantity of ACM tile is 10,250 sq/ft. General condition of material was fair to poor with most tiles broken into numerous small pieces. In most locations, tiles mastic and leveling compound were either exposed on the bare flooring/ tiles or broken into small pieces and scattered around the floor. The potential hazard associated with this material is considered medium to low given the wet conditions and potential friability.. Removal of all floor tiles and mastics may not be possible without causing damage to the flooring.

Wainscot cement asbestos board were identified in all rooms throughout the building and average four in height with the exception of rooms 106, 108, 134 and 135 where they ranged from six to seven feet in height. Most material was in fair condition with a potential medium to low inhalation hazard given the wet condition and potential friability. Estimated volume of CAB is 24,000 square feet. It is unclear given the current condition of the building if removal could be completed in all areas of the building without causing damage to the building.

Acoustical ceiling tiles and mastic were observed in rooms 110, 111, 112 and 124. The condition of this material varied depending on whether it was still attached to the ceiling or whether it was lying on the floor. The tiles and mastic attached to the ceiling are considered a low friable and inhalation hazard while those tiles and mastic lying in the floor are in extremely poor condition and considered a high hazard. Estimated quantity of acoustical tiles is 3,600 sq/ft. Removal and disposal of all ceiling tiles on lying on the floor is estimated at $ 12,000.

A total of eight fire doors were identify and assumed to contain ACM in this building. No damage was noted on the doors and no asbestos suspected material was exposed. Overall condition of the doors appears to be good to fair. It is believed that the fire doors could remain in the building in their current condition without adding to the existing inhalation risk associated with asbestos. All other identified materials were observed in limited quantities.

Additionally, the following potential ACM were identified on the exterior of the building:
- Cement clap board (identified to contain 30-50% chrysotile)
- Door packing material
- Roofing felt material
- Roof tar

These materials were not quantified and no removal/stabilization costs calculated for these.

The following potential hazardous materials were identified within the building:
- PCB lighting ballast (approx 82 units)
- Lead-based paint

3.9.3 Cost Analysis for 2 Story Wood Portion of Battery Building Only (Includes retention of concrete portion of building for either demolition or stabilization option)

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$627,223	$1,428,828	$48,523

[1]Cost of demolition for the Battery Building calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Battery Building calculated to include stabilization of the concrete portion of the building only, replacement of the roof and siding, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.9.4 Cost Analysis for Entire Battery Building Structure

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$765,322	$1,671,443	$75,369

[1]Cost of demolition for the Battery Building calculated to include demolition of the entire structure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Battery Building calculated to include stabilization of the entire concrete and wooden portions of the structure, replacement of the roof and siding, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.10 Target Ranging Radar

3.10.1 Facility Information

AHRS Site Number ANC-795
Date of Construction: 1962
Function: Target Ranging
Building Materials: Metal, Fiberglass, Corrugated Aluminum Siding

3.10.2 Visual Hazard Materials Assessment

The following Suspected ACMs were identified within the building:

- HVAC vibration gaskets
- Fire Doors
- Steam and Hot Water line insulation material (confirmed to contain 20-30% amosite and 3-5% crocidolite)

Estimated linear footage of ACM pipe wrap is 300 lineal feet. All material was in poor to extremely poor condition. Broken and exposed friable material could be observed in several locations throughout the building. This material is considered friable and the inhalation hazard is considered high. If this material is allowed to dry, the potential exposure hazard would change for high to extremely high.

Additionally, the following potential ACM were identified on the exterior of the building:

- Door packing material
- Roofing felt material
- Silver fiber paper
- Patch Tar

3.10.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$64,557	$63,030	$485

[1]Cost of demolition for the Target Tracking Radar calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Target Tracking Radar calculated to include stabilization of the superstructure, removal of the sheet metal siding, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.11 Target Tracking Radar

3.11.1 Site Information

AHRS Site Number ANC-793
Date of Construction: 1959
Function: Tracking Radar
Building Materials: Metal, Fiberglass

3.11.2 Visual Hazard Materials Assessment

The following Suspected ACMs were identified within the building:

- HVAC vibration gaskets
- Fire Doors
- Steam and Hot Water line insulation material (confirmed to contain 20-30% amosite and 3-5% crocidolite)

Estimated linear footage of ACM pipe wrap is 300 liner feet. All material was in poor to extremely poor condition. Broken and exposed friable material could be observed in several locations throughout the building. This material is considered friable and the inhalation hazard is considered high. If this material is allowed to dry, the potential exposure hazard would change for high to extremely high.

Additionally, the following potential ACM were identified on the exterior of the building:

- Door packing material
- Roofing felt material
- Silver fiber paper
- Patch Tar

These materials were not quantified and no removal/stabilization costs calculated for these.

3.11.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$64,557	$63,030	$485

[1]Cost of demolition for the Target Tracking Radar calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Target Tracking Radar calculated to include stabilization of the superstructure, removal of the sheet metal siding, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

3.12 Missile Tracking Radar

3.12.1 Site Information

AHRS Site Number ANC-794
Date of Construction: 1959
Function: Radar
Building Materials: Metal, Fiberglass

3.12.2 Visual Hazard Materials Assessment

The following Suspected ACMs were identified within the building:

- HVAC vibration gaskets
- Fire Doors
- Steam and Hot Water line insulation material (confirmed to contain 20-30% amosite and 3-5% crocidolite)

Estimated linear footage of ACM pipe wrap is 300 liner feet. All material was in poor to extremely poor condition. Broken and exposed friable material could be observed in several locations throughout the building. This material is considered friable and the inhalation hazard is considered high. If this material is allowed to dry, the potential exposure hazard would change for high to extremely high.

Additionally, the following potential ACM were identified on the exterior of the building:

- Door packing material
- Roofing felt material
- Silver fiber paper
- Patch Tar

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3.12.3 Cost Analysis

Demolition[1]	Stabilization[2]	Annual Maintenance Cost[3]
$64,557	$63,030	$485

[1]Cost of demolition for the Target Tracking Radar calculated to include demolition of the superstructure, abatement of hazardous materials and retention of the concrete foundation.
[2]Cost of stabilization for the Target Tracking Radar calculated to include stabilization of the superstructure, removal of the sheet metal siding, abatement of hazardous materials, and sealing off of entrances.
[3]Maintenance cost is calculated to be the original cost of stabilization (minus abatement) conducted once every ten years. Annual maintenance cost is the maintenance cost divided by 10.

4.0 DISCUSSION

Site Summit like much of the land entrusted to the stewardship of the US Army is unique in several ways. In addition to a retired Nike site, it is also unique geographically, strategically and climatologically. It is the northern divide for the Ship Creek watershed (the exclusive source of potable water for Ft. Richardson, Elmendorf and an available resource for the Municipality of Anchorage) and holds potential for development of renewable energy resources within its basin and along the lower ridge. Each of these special features establishes courses of action and resultant policy for management of the resource.

The Fort Richardson environmental mission is to be a good steward of the resources entrusted to it by the American people. The question has been asked "Why the demolition costs estimated at Site Summit are so high and why did they include complete abatement for each facility?" Since the subject estimates are likely to serve in the capacity of a basis for establishing funding as well as for developing management decisions they need to be as realistic as possible to best serve all requirements.

On the issue of abatement it has been the policy of the Army to deal with environmental issues as they arise unswervingly and wholly whenever encountered in renovation or demolition of projects. Part of that philosophy is the consideration that the expense of abatement will never be less costly than it is right now. Since funding for government programs is cyclical in nature and subject to the perceived need and whim of politics future funding is at best uncertain. It is therefore in the Army's best interest to deal with all situations encountered upfront at the time work at the subject location is in progress.

Photo 1: Battery Building

Additionally any item of work left undone or partially complete at this juncture has the potential to grow into an ever larger future expense. It is important to recognize the impact of possible future maintenance in a time and political climate when the Army might not be able to obtain funds for this kind of work. To not recognize the very high costs that could be associated with required maintenance and /or mitigation is to be fiscally irresponsibility.

It is obvious from careful observation at Site Summit that much of the degradation to the existing facilities has been from the wind. Don Wycoff stated that "in his 35 year career as an architect in Alaska he has never viewed wind damage so extensive or pervasive." (See photos #1 and #2) Consider as an example the difficulty of maintaining sheet metal roofing or siding in such a high wind area. The wind friction against the edges of the metal sheets set up harmonics that work relentlessly to loosen fasteners, enlarge the fastening holes and fatigue the sheet metal itself to a point of failure. It is obvious from careful observation that much of the degradation to the existing facilities has been from the wind and is in all probability accelerating. As various materials are being degraded from water saturation and ultraviolet they are delaminating becoming more abraded and susceptible to wind damage.

Photo 2: Clamshell radar

All exiting sheet metal bears the scars of wind borne projectiles. Whole areas of plywood sheathing have been blasted away from the Battery Building (See photo #1). The windward sides of the water tanks supporting the radar clamshells have been weather beaten to the extent that the majority of the insulation has been scoured away. That is no small matter when you consider that the insulation utilized was a foamglass product (See photo #2).

Foamglass insulation is a cellular glass insulation manufactured by Pittsburgh Corning http://www.foamglasinsulation.com/ for heavy duty industrial installations. It is promoted as having long term performance, being dimensionally stable and of high compressive strength. It can be utilized where it is subjected to heavy compressive loads for industrial loading such as under slabs bearing lift trucks etc. Yet the force of the wind at Site Summit has virtually eliminated the material on the wind exposed faces (it is more or less intact on the protected side) of the tanks. In photo #2 you can see striations resulting from wind erosion.

Photo 3: Electrical Substation B

Vandalism is another destructive force very much present at site summit. It has become apparent that any attempt to secure or otherwise block access to the existing structures serves only as an incentive to vandals to use whatever force is necessary to gain admittance. On June 19, 2008 a combined party of interested persons including the Friends of Nike Site Summit, Alaska Association of Historic Preservation, National Park Service and Army personnel spent most a day at Site Summit to review the condition of the existing structures.

At that time Substation"B" had been recently secured after installation of a new electrical switch this last year. The building was secured with heavy duty double doors, three hinges per door and heavy duty hasp with padlock. The door had a small window secured with a barred opening. The building contained nothing of interest other than a solitary weather proof electrical switch cabinet that are commonly seen along roadways all over post and the city.

Two weeks later on July 3rd, 2008 the Site Summit project estimating team was on site doing additional assessment. The team discovered substation "B" had been forcibly entered. A person or persons had used equipment of adequate mass to pull three inch fasteners from their restraints and pulled the adjacent steel structure from its attachment. See attached photos #3 and #4).

Photo 4: Electrical Substation B

In consideration of all of the forces at work on Site Summit it is important to consider the potential for future mediation and/or maintenance costs. As the site exists at this moment hazardous materials are being further

spread by vandals and the forces of nature. At this point delay equals more cost to the Army for cleanup. The longer the delay the more the costs are going to escalate..

5.0 CONCLUSION

The purpose of this cost analysis was to determine a course of action that effectively manages Nike Site Summit Historic District to preserve the important Cold War history of the site and effectively tell the story of those who served there, removes or abates hazardous substances to legally compliant levels to protect human health and safety at Site Summit, manages structures to protect human health and safety and meets standards of Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks*, prevents the potential of vandalism from interrupting vital State and Federal communications equipment located at the Upper Site; and reduces approximately 63,500 ft^2 of excess buildings as required by AR 415-15, *Army Military Construction and Non-appropriated – Funded Construction Program Development and Execution*.

Due to the extreme site conditions and no potential for reuse, the wood structures are too difficult and costly to maintain. The concrete and metal structures are more costly to demolish and less costly to maintain. Removing the sheet metal siding and retaining concrete and metal infrastructure significantly reduces the potential for wind damage and removes the mystery for vandals. Based on this cost analysis, considering initial and long term costs, the Engineering Department recommends the following course of action:

Retain and abate all 3 clamshell radar structures, retain and abate concrete wing of the Battery Building; abate and demolish the two story wood portion of the battery building while retaining the foundation, exterior stairwells and preserving the interior wall art; remove the sheet metal siding and roof of the electrical substations; retain and abate the metal frames and foundation of the electrical substations; retain and abate the foundation and lower concrete walls of the missile maintenance facility and remove siding, upper wood framing and roof; demolish and abate the launch control facility while retaining the concrete foundation; demolish and abate the vehicle maintenance facility while retaining the concrete foundation; remove the collapsed dog kennel while retaining the concrete foundation; and demolish and abate the three sentry stations while retaining the concrete foundations.

APPENDIX "A"

1. ENVIRONMENTAL RESTORATION

1.1 POL Contaminated Soils

Below are cubic yard costs for excavation, removal and thermal treatment of POL contaminated soil determined from two projects recently conducted at Elmendorf AFB in 2008. These costs account for preparation of all necessary permits, planning documents, and reports; field screening and laboratory; Civil Services – excavation, hauling, and backfill; thermal treatment of soils; administrative and management costs including fees.

ST429 Soil Cleanup at Elmendorf AFB (2008) – Excavation, removal, and thermal treatment of 250CY (375 tons) POL contaminated soil at Elmendorf AFB, AK - **$422/CY**
S33 Soil Cleanup at Elmendorf AFB (2008) – Excavation, removal, and thermal treatment of 900CY (1350 tons) POL contaminated soil at Elmendorf AFB, AK - **$288/CY**

1.2 PCB Contaminated Soils

Estimated cost for excavation, removal, and off-site disposal of PCB contaminated soil at Fort Richardson - **$1,500 - $2,000/CY.** This cost includes excavation, removal, and off-site disposal of PCB soils. Includes preparation of all necessary permits, planning documents, and reports; field screening and laboratory costs; Civil Services – excavation, hauling, and backfill; barging/truck transportation of soils to a Lower 48; disposal costs; and administrative and management costs including fees.

2. BUILDING DEMOLITION WASTE

2.1 Asbestos-Containing Materials

The U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) and the State of Alaska Department of Labor (ADOL) regulate the disturbance of ACM. These regulations set permissible exposure limits, require testing for airborne asbestos fibers, establish work practices and controls, mandate worker medical surveillance and require worker training and protection. The EPA defines ACM as any material containing greater than one percent (1%) asbestos. The OSHA regulations, Title 29 of the Code of Federal Regulations (CFR), Part 1926, and Subpart 1101 (29 CFR 1926.1101) apply to all workplace activities involving asbestos.

The EPA regulation (40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP)), established procedures for handling ACM during removal and disposal. The NESHAP regulations address three categories of ACM in a building being demolished:

1. Friable, or regulated, ACM which must be removed from a building before the building is demolished,
2. Category I non-friable ACM (resilient flooring, roofing, and mastics), and
3. Category II non-friable ACM (non-friable ACM other than Category I ACM).

The EPA allows Category I and II non-friable ACM to remain in a building during demolition if: (1) Category I ACM is not in poor condition and is not friable, and (2) the probability is low that Category II

ACM will become crumbled, pulverized or reduced to powder during demolition. The condition of the ACM and method of demolition will generally determine if Category I and II non-friable ACM may be left in the building during demolition. This EPA standard also requires that no visible emissions be generated from the ACM during removal and transportation and prohibits intentional burning of any building containing ACM.

This regulation requires an owner or the owner's contractor to notify the EPA of asbestos removal operations and to establish responsibility for the removal, transportation, and disposal of asbestos-containing materials. The EPA, the State of Alaska Department of Environmental Conservation (ADEC), and the disposal site operator regulate the disposal of asbestos. Asbestos being transported to the disposal site must be sealed in leak tight containers prior to disposal and must be accompanied by disposal permits and waste manifests. The disposal site must be permitted by ADEC to receive asbestos wastes.

2.2 Lead-Containing Materials

Federal OSHA (29 CFR 1926.62) and the State of Alaska (8 AAC Chapter 61) have promulgated or adopted regulations that apply to all construction work where employees may be exposed to lead. Due to the potential presence of lead-containing paint in and on the buildings or facilities to be demolished, the contractor is required to monitor his/her workers to determine if they will be exposed to lead at or above the action level established in the regulation. Until this "initial determination" establishes that workers are not exposed above the permissible exposure limit, the contractor is required to provide worker and site protection procedures. Continued air and medical monitoring may be required if exposure is above the action level.

There are no requirements to remove lead paint from a building prior to demolition. However, there are OSHA worker protection requirements which must be followed by employers and employees during the disturbance of lead-containing materials. Burning of materials with lead-containing paints should not be performed as this will generate lead fumes and the resulting debris will typically become hazardous waste. The EPA requires that actual construction or demolition debris that contains lead or lead containing paint be tested using the TCLP to determine if the waste must be treated as hazardous waste. Building waste materials containing lead are considered hazardous waste if the lead levels, as determined by a TCLP test of the waste, exceed 5.0 milligrams per liter (5.0 mg/l). The EPA and the disposal site operator regulate the disposal of lead containing wastes. Lead-containing materials that are characterized as hazardous waste by the TCLP test must be packaged and transported to a hazardous waste disposal site in accordance with EPA regulations, and must be accompanied by disposal permits and waste manifests. The disposal site must be permitted by the EPA to receive hazardous waste. Some disposal sites have adopted requirements for lead disposal that are more restrictive than the EPA regulations. There are no hazardous waste disposal sites in the State of Alaska. All federal, state and local standards regulating lead and lead-containing wastes should be followed during the demolition of all buildings on the site.

2006 Facility Paint Sampling at Barter Island Long Range Radar Site - Lead in paints tested varied from a trace amounts to 2.95 mg/cm2. Lead based paints (paint containing more than 1.0 mg/cm2 of lead) were identified in the facility on interior and exterior structural steel components and on the exterior door. Lead was detected at very low levels in the remaining paints tested.

2.3 PCBs

Bulk product waste that contain PCBs at 50 ppm or greater are regulated by the EPA. The Alaska Department of Environmental Conservation (ADEC) has adopted the federal regulations regarding PCB bulk product waste. The EPA has promulgated regulations (40 CFR Part 761) that cover the proper handling and disposal of PCB-containing materials. EPA regulation 40 CFR 761.62 allows the disposal of PCB bulk product waste such as applied dried paints, coatings or sealants and non liquid building demolition debris to be disposed of in a solid waste landfill permitted, licensed, or regulated by a state as a municipal non-hazardous waste landfill. Under 40 CFR 761.62 any person disposing of PCB bulk waste in a waste management facility that does not have a commercial PCB storage or disposal approval must provide written notice to the facility a minimum of 15 days in advance of the first shipment. Content of the required notice is specified in 40 CFR 761.62. PCBs were assumed present in light ballasts unless the ballasts were specifically labeled "No PCBs". Workers who remove or handle PCB containing or PCB-contaminated materials or who transport or dispose of PCB wastes must be trained and certified in hazardous waste operations and emergency response (HAZWOPER) as required by 29 CFR 1910.120 and the State of Alaska Department of Labor (8 AAC 61). The Department of Transportation under 49 CFR Parts 100-199 regulates the marking, packaging, handling and transportation of hazardous materials. All federal, state and local standards regulating PCBs and PCB waste must be followed during the demolition of these facilities.

2.4 Other Hazardous Materials

Lead has been identified in bell and spigot connections of drain piping, flashing, and in lead-acid batteries. Prior to building demolition, these items should be removed and recycled and not allowed to enter the waste stream. Lead items not recycled should be disposed of as hazardous waste in accordance with 40 CFR 260-263.

Mercury-containing materials were encountered in the buildings. These included thermostats, control system switches and lamps. Building waste materials containing mercury or mercury compounds are considered hazardous waste if the mercury levels, as determined by a TCLP test of the waste, exceed 0.2 milligrams per liter (0.2 mg/l). The EPA has promulgated regulations (40 CFR Parts 260, 261, 262, 263 and 273) that cover the proper characterization, handling, transportation and disposal of hazardous waste. Workers who remove or handle hazardous waste or transport or dispose of hazardous wastes shall be trained and certified in HAZWOPER as required by 29 CFR 1910.120 and the Alaska Department of Labor (8 AAC 61). The U.S. Department of Transportation regulates the marking, packaging, handling and transportation of hazardous materials under 49 CFR Parts 100-199.

Smoke detectors and self-luminous products that contain Tritium, Krypton -85, or Promethium-147 are considered radioactive. There are special disposal requirements for products that contain Tritium, Krypton -85, or Promethium-147 that are generally licensed. Data from the Nuclear Regulatory Commission (NRC) indicates that most all tritium powered exit signs are generally licensed and therefore must be disposed of at a licensed disposal facility or returned to the manufacturer/distributor for disposal. Most smoke detectors are exempt from licensing and although they contain small amounts of radioactive materials (typically Americium), they may be disposed in the local landfill. Licensed radioactive products are regulated by Nuclear Regulatory Commission standard 10 CFR 20 and 10 CFR 32. There are no licensed disposal facilities for radioactive wastes in Alaska.

EPA standard 40 CFR 82 regulates the recovery and disposal of ozone depleting compound such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). These can be found in refrigerants in older cooling and refrigeration systems and in some types of fire extinguishers. These materials are typically recovered and recycled by certified technicians. Used ethylene and propylene glycol heating

fluids should be recycled if possible. If used glycol fluids are not being recycled and TCLP metals are present above the threshold limit, they should be treated as hazardous waste in accordance with 40 CFR 260-263.

Disposal Costs – Other Hazardous Materials

Regulated waste identified during environmental surveys of former White Alice and DEW Line sites throughout Alaska which may be similar to those present at Nike Site Summit include the following: used oil/hydraulic fluid, glycol/water antifreeze, chlorofluorocarbon refrigerant/Freon, batteries, mercury switches, fluorescent light ballasts, fluorescent and Incandescent light bulbs, fire extinguishers, compressed gas, smoke detectors and misc. cleaners/degreasers.

Estimated disposal costs through DRMS for the above items are as follows:

Item	Unit	Rate
Batteries Alkaline	lb	$1.13
Batteries Lead Acid	lb	$0.50
Incandescent light bulbs/halogen lamps	lb	$0.25
Fluorescent light ballasts	lb	$0.74
Fluorescent light bulbs	lb	$1.50
Mercury Switches	lb	$7.69
Mercury lamps	lb	$1.25
Smoke Detectors	ea	$7.00
Used oil/hydraulic fluid	lb	$0.25
Glycol/Water Antifreeze	lb	$0.50
Chloroflourocarbon/Refrigerant	ea	$780.00
Commercial Chemical Products	lb	$0.35
Transformers over 499 ppm PCBs	lb	$0.86
Transformers >50-<499 ppm PCBs	lb	$0.59
Transformers less than 50 ppm PCBs	lb	$0.39
Perform appropriate analysis to properly identify unknown hazardous waste	ea	$863.00
Perform Hazardous Waste Characteristics Analysis to determine ignitability (D001), corrosivity (D002), reactivity (D003)	ea	$278.00

Note – Above unit costs for disposal were taken from DRMS website and AF Cleans Sweep Reports and are for disposal only. Additional costs for removal, packaging, marking, labeling, transportation, and preparing paperwork will be required. Estimated cost are as follows:

Item	Unit	Rate
Labor - Removal of Regulated Waste Items	hr	$52.00
Labor - Package material/waste for turn-in to the DRMO	hr	$52.00
Labor - Prepare waste documentation, labeling and marking containers.	hr	$52.00
Prepare Hazardous Material/Waste items for turn-in to the DRMO.	hr	$52.00

Provide Certificates of Disposal	ea	$25.00
Mob/demob to site	ea	$1,500.00
Set up fees	ea	$1,500.00
Equipment/Operator	hr	$150.00
Trucking waste from Site to DRMO	ea	$250.00